

## REMARKS

This communication is submitted in response to the Office Action dated August 3, 2004.

Claims 1-19 and 22-44 are pending in the subject application with claims 20 and 21 being canceled herewith. Claims 5-17, 26-36, 38 and 41-44 stand allowed by the Examiner.

This amendment does not raise any new issues or require further consideration or search, and this amendment should thusly be entered.

Reconsideration of the subject application is courteously requested in view of the foregoing amendment and the following remarks.

The rejection of dependent claim 19 under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, as containing subject matter not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention is submitted to be clearly unjustified. Claim 19 recites "said semantic space is derived from latent semantic analysis", and a description of latent semantic analysis (LSA) being used to derive or produce a semantic space is set forth in the specification as originally filed on page 14, lines 10-13 and page 15, lines 7-8. In particular, the specification describes how LSA is used to derive a semantic space by representing words in text as data or points in a high-dimensional (e.g. 50-1000) content vector space or semantic space. From this description, one skilled in the art is clearly enabled to make and/or use the invention. Accordingly, the rejection of claim 19 under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, is clearly improper and should be withdrawn.

The rejection of dependent claims 20 and 21 under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, is moot in view of the cancellation of claims 20 and 21. The features recited

in claims 20 and 21 are encompassed by independent claim 18 and, in view of the burden involved in revising the specification to incorporate the subject matter disclosed in the publications incorporated by reference, claims 20 and 21 have been canceled for the sake of simplicity, to expedite prosecution and to reduce the outstanding issues for appeal.

The rejection of claims 1-4, 18, 19, 22-25, 37, 39 and 40 as being unpatentable over Fontana et al in view of Berman is respectfully traversed for the following reasons.

Independent claim 1 relates to an automated, computer-based reading tutoring system and recites “a plurality of instructional passages of different, predetermined levels of reading difficulty ...; semantic space method means for receiving a summary prepared by the student ... of one of said instructional passages ..., said semantic space method means being adapted to automatically evaluate the summary for congruence with said one of said instructional passages and to automatically determine which of said instructional passages ... the student should read next based on the congruence of the summary with said one of said instructional passages; and immediate feedback data ... including an indicator reflective of the congruence of the summary with said one of said instructional passages and including the identity of which of said instructional passages the student should read next.” As explained below, the foregoing features are not taught or suggested by Fontana et al in view of Berman.

With respect to Applicants’ previous argument that neither Fontana et al nor Berman relates to a system or method of reading tutoring, the Examiner maintains that any limitations to reading is present only in the preamble of the claims, does not limit the structure of the claimed device and recites only an intended use of structure. On all accounts, the Examiner’s conclusions are erroneous. Independent claim 1, as well as

rejected independent apparatus claim 18 and rejected independent method claims 23 and 27, require in the body of the claim that the domain of discourse include a plurality of instructional passages of different, predetermined levels of reading difficulty. Neither Fontana et al nor Berman discloses instructional passages of different predetermined levels of reading difficulty, and to interpret either reference as disclosing this feature requires conjecture and impermissible hindsight made possible only from the teachings of Applicants' invention. The systems disclosed by Fontana et al and Berman employ topics of different subject matter without any regard to reading difficulty. Different subject matter topics bear no relation to topics of different levels of difficulty, much less instructional passages of different predetermined levels of reading difficulty. In the systems of Fontana et al and Berman, the subject matter topics do not even have to be presented to the user in textual or readable form.

The Examiner states that it is old and well known in the area of adaptive educational systems to include "questions, topics, or content at a variety of difficulty levels". The Examiner's broad reference to adaptive educational systems fails to make it obvious to provide instructional passages of different predetermined levels of reading difficulty in the systems of Fontana et al or Berman. Neither reference even deals with subject matter topics of different levels of difficulty and, consequently, neither reference provides technical features needed to implement an adaptive educational system, much less an automated computer-based system of reading tutoring. It cannot be considered obvious to incorporate instructional passages of different predetermined levels of reading difficulty in the systems of Fontana et al or Berman when the systems of Fontana et al and Berman are not even designed to operate with subject matter topics of different levels of difficulty.

The semantic space method means recited in claim 1 is also not found in either Fontana et al or Berman since neither reference teaches or suggests any means for performing the functions recited to be performed by the semantic space method means. In addition, neither reference discloses any means which can fairly be considered a "semantic space method" means. The Examiner refers to Fontana et al as teaching multiple occasions where the user of the system enters "input" and specifically refers to column 2, line 55-column 3, line 8. The inputs to which the Examiner refers are explicitly described in Fontana et al as being accomplished by clicking an icon or title using a mouse, or other pointer device, or contacting an icon or title on a display screen which is pressure sensitive (column 4, lines 23-27), none of which involves receiving a user prepared summary of a source content or instructional passage. Furthermore, in response to the user input, the system of Fontana et al performs only the rudimentary tasks of retrieving and displaying information from a storage means (column 3, line 61-column 4, line 5). Accordingly, in addition to Fontana et al failing to disclose any means for receiving a user prepared summary of an instructional passage as input, the rudimentary processing functions performed by the system of Fontana et al fail to involve the high level intellectual functions performed by the semantic space method means of automatically evaluating a student prepared summary for congruence with an instructional passage and automatically determining which instructional passage the student should read next based on the congruence. The only opportunity the system of Fontana et al offers a user to enter textual information is the notebook function allowing the user to take notes in an electronic notebook displayed on the monitor screen. The notes are merely stored by the system without being evaluated by the system for content or any other characteristics (column 9, lines 7-20). With respect to the guiding

prompts presented to the user by the system of Fontana et al, it is noted that the system does not receive any user input in response to the guiding prompts as they merely facilitate mental exercises to be performed independently by the user without any interaction with the computer system. Aside from there being no means of any kind in Fontana et al for performing the functions recited in claim 1 for the semantic space method means, there are no teachings or suggestions whatsoever by Fontana et al of any means that reasonably may be characterized as a “semantic space method” means within the context of a semantic space method as described in Applicants’ specification.

There being no disclosure in Fontana et al of any means capable of performing the functions recited for the semantic space method means, it follows that Fontana et al does not and cannot disclose immediate feedback data unique to the functions performed by the semantic space method means, namely, an indicator reflective of the congruence of a student prepared summary with an instructional passage and the identity of an instructional passage the student should read next based on the congruence as recited for the immediate feedback data in independent claim 1.

Although the system of Fontana et al is capable of recommending additional source contents for the user, the recommendation bears no relation whatsoever to matching the source content with a student’s reading ability based on an evaluation performed by the system of congruence between an instructional passage and a student prepared summary of the instructional passage. The semantic space method means and immediate feedback data recited in claim 1 can only be found in Fontana et al by arbitrarily imparting to Fontana et al teachings not found therein which exceed the reasonable metes and bounds of its disclosure, and this is legally improper.

Like Fontana et al, Berman fails to disclose an automated computer-based

reading tutoring system including a plurality of instructional passages of different predetermined levels of reading difficulty. The target knowledge components used in the system of Berman may have different subject matter contents, as opposed to different levels of difficulty, and are not even required to be in textual or readable form. Accordingly, Berman does not rectify the deficiency of Fontana et al with respect to instructional passages of different predetermined levels of reading difficulty. Berman like Fontana et al presents a system lacking the technical features to make any meaningful integration of instructional passages of different levels of difficulty. The Examiner's general reference to adaptive educational systems thusly does not make it obvious to incorporate instructional passages of different levels of reading difficulty in the system of Berman or in the system of Fontana et al as modified by Berman. Berman like Fontana et al does not disclose or suggest semantic space method means, Berman having no means whatsoever for receiving a student prepared summary of an instructional passage, for automatically evaluating the summary for congruence with the instructional passage and for automatically determining which instructional passage the student should read next based on this congruence. The learning system of Berman presents multiple choice or fill in the blank questions and receives as input narrow and specific user constructed answers to these questions not involving a user prepared summary of the target knowledge component. The system of Berman evaluates the user constructed answers merely for the presence of keywords and/or phrases appearing in predefined expected answers, and this evaluation does not involve an evaluation of congruence between the user constructed answers and the target knowledge component itself. In contrast, the semantic space method means of claim 1 functions to automatically evaluate a student prepared summary of an instructional

passage for congruence with the instructional passage itself. In addition, Berman fails to disclose any means whatsoever that may reasonably be considered a “semantic space method” means, so that the type of evaluation performed by the learning system of Berman is not and cannot be the same as the type of evaluation performed by the semantic space method means recited in claim 1. The semantic space method means considers the similarity of meaning of words and passages based on the context in which they occur, and the evaluation performed by the Berman system is unrelated to meaning-bearing context. Like Fontana et al, it follows that Berman does not and cannot provide immediate feedback data including an indicator reflective of the congruence of an instructional passage and a student prepared summary of the instructional passage and including the identity of an instructional passage the student should read next based on this congruence. The feedback provided by the learning system of Berman comprises either remedial information designed to elicit a correct response to the question, further testing, or advancement to new material. Where new material is recommended, the new material constitutes “other target knowledge topics” (column 4, lines 59-62) without regard to level of difficulty, as opposed to an instructional passage of lesser, greater or the same reading difficulty based on a congruence evaluation. Accordingly, there are no teachings or suggestions whatsoever in Berman which, when combined with Fontana et al, arrive at the claimed invention, except with the use of impermissible hindsight and by supplying teachings not found within the reasonable metes and bounds of the references themselves. Accordingly, independent claim 1 is submitted to be clearly patentable over Fontana et al in view of Berman and should be allowed along with dependent claims 2-4.

With respect to dependent claim 2, neither Fontana et al nor Berman provide any

teachings whatsoever of a semantic space method means, much less one or more semantic spaces produced by a machine-learning method wherein the semantic space method means includes one or more semantic space algorithms operating on the one or more semantic spaces. The rudimentary processing tasks of storage and retrieval of information involved in the system of Fontana et al and the identification of the presence of keywords/phrases in a user constructed response as taught by Berman are simple, uncomplicated computer processing tasks not requiring the complexity of semantic spaces produced by a machine-learning method and semantic space algorithms operating on the semantic spaces. To find the features recited in claim 2 in Fontana et al or Berman necessitates the use of impermissible hindsight made possible only with the teachings of the claimed invention itself and furthermore requires that the references be interpreted beyond the reasonable scope of their disclosures.

Accordingly, claim 2 is submitted to be clearly patentable over Fontana et al in view of Berman for the additional limitations recited therein as well as being allowable with independent claim 1.

Dependent claim 3 recites a machine-learning algorithm incorporating latent semantic analysis. As pointed out above in connection with dependent claim 2, neither Fontana et al nor Berman contemplates a machine-learning method much less a machine-learning method that includes a machine-learning algorithm incorporating latent semantic analysis. Accordingly, dependent claim 3 is submitted to be clearly patentable over Fontana et al in view of Berman for the additional feature recited therein as well as being allowable with independent claim 1.

Independent claim 18 requires a plurality of instructional passages of different predetermined levels of reading difficulty and, as explained above in connection with



independent claim 1, this feature is not taught or suggested by either Fontana et al and/or Berman and cannot properly be considered obvious to incorporate in Fontana et al or Berman in view of the Examiner's reference to adaptive educational systems. Independent claim 18 also recites a semantic space derived from a machine learning method, and a semantic space derived from a machine learning method is described in Applicants' specification as a high dimensional content vector space in which words or sets of words are represented as points in the vector space for extracting and inferring relations of expected contextual usage of words. In no way do Fontana et al and Berman even remotely infer such a semantic space. Given the types of basic, rudimentary processing tasks performed by the systems of Fontana et al and Berman, the references cannot properly be interpreted as encompassing a feature irrelevant to the processing tasks performed. The feature recited in claim 18 of a semantic space module for receiving a summary prepared by a student of an instructional passage, with the semantic space module operating on the semantic space to automatically evaluate the summary for congruence with the instructional passage and to automatically determine the instructional passage the student should read next based on the congruence is not found in Fontana et al or Berman. Neither Fontana et al nor Berman disclose a system which receives a student prepared summary of an instructional passage, which automatically evaluates the summary for congruence with the instructional passage and which automatically determines an instructional passage the student should read next based on this congruence. Accordingly, neither reference can be considered as disclosing a semantic space module for performing the latter functions and in fact do not teach or suggest a semantic space operated on by a semantic space module. It follows that Fontana et al and Berman do not and cannot

disclose the immediate feedback data recited in claim 18 since the systems disclosed by Fontana et al and Berman lack any features by which the recited immediate feedback data can be obtained. The individual deficiencies of Fontana et al and Berman with respect to the features recited in claim 18 are not rectified when the teachings of the references are combined. Accordingly, independent claim 18 is submitted to be clearly patentable over Fontana et al and Berman for the foregoing reasons as well as the reasons discussed above in connection with independent claim 1. Independent claim 18 should therefore be allowed along with dependent claims 19 and 22.

Dependent claims 19 and 22 are submitted to be clearly patentable over Fontana et al in view of Berman for the additional features recited therein as well as being allowable with claim 18 for the same reasons discussed above in connection with dependent claims 2 and 3.

Independent method claim 23 recites the steps of "providing a domain of discourse ... including a plurality of instructional passages of different, predetermined levels of reading difficulty; ... receiving a summary of the selected instructional passage prepared by the student ...; automatically evaluating the summary for congruence with the selected instructional passage to obtain a measure of the student's reading comprehension; automatically selecting an instructional passage from the domain of discourse that the student should optimally read next based on the measure of the student's reading comprehension; communicating feedback data to the student ... including an indicator reflective of the student's reading comprehension and the identity of the instructional passage that the student should optimally read next; and repeating said receiving, said automatically evaluating, said automatically selecting and said

communicating steps for the instructional passage that the student reads next.” The steps recited in independent claim 23 are not disclosed or suggested by Fontana et al in view of Berman. The discussion set forth above in connection with independent claims 1 and 18 demonstrates that Fontana et al and Berman, considered singly or in any reasonable combination, fails to teach or suggest any features or means capable of carrying out the steps recited in claim 23. Accordingly, independent claim 23 is submitted to be clearly patentable over Fontana et al in view of Berman and should be allowed along with dependent claims 24 and 25.

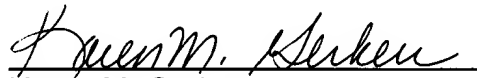
With respect to dependent claim 25, it is noted that neither Fontana et al nor Berman discloses steps of automatically evaluating and automatically selecting performed using semantic space algorithms in that no semantic spaces or semantic space algorithms are disclosed by Fontana et al or Berman as explained above. Dependent claim 25 is thusly submitted to be clearly patentable over Fontana et al in view of Berman for the additional limitation recited therein as well as being patentable with independent claim 23.

Independent claim 37 recites the steps of “viewing a selected instructional passage from a domain of discourse, including a plurality of instructional passages of different, predetermined levels of reading difficulty ...; preparing a summary of the selected instructional passage; submitting the summary to the reading tutoring system; receiving immediate feedback data ... including an indicator reflective of the congruence of the summary with the selected instructional passage and including the identity of one or more recommended instructional passages ... that should be read next based on the congruence ...; and repeating said steps of viewing, reading, preparing, submitting and receiving for one of the recommended instructional

passages". From the explanations set forth above, it is evident that none of the latter steps are disclosed or suggested by Fontana et al in view of Berman, and neither reference discloses components by which the steps can be accomplished. Therefore, independent claim 37 and its dependent claims 39 and 40 are clearly patentable over Fontana et al in view of Berman and should be allowed.

In light of the foregoing, all of the claims in the subject application are submitted to be in condition for allowance. Action in conformance therewith is courteously solicited. Should any issues in the subject application remain unresolved, the Examiner is encouraged to contact the undersigned attorney.

Respectfully submitted,



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